FOREST CONDITIONS OF CUBA.

VOL. VI MAY, 1900 No. 5

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devoted to the care and use of
forests and forest trees and
to related subjects

IN THIS ISSUE:

FOREST PROTECTION AND RESTORATION.
FORESTS OF COCHIN CHINA.
OBSERVATIONS OF OHIO WOODLANDS.
STUDY OF FORESTRY AT YALE.
THE MINNESOTA PARK.
FORESTS OF INDIANA.
FOREST INFLUENCE ON WATER FLOW.
STUDYING AMERICAN FORESTS.
RECENT LEGISLATION. CURRENT COMMENT.

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(Photo. secured by DR. GIFFORD.)

A TYPICAL FOREST SCENE IN WESTERN CUBA.

THE FORESTER.

VOL. VI. MAY, 1900. No. 5

Forest Conditions of Cuba.

Observations of a Tourist Through the Island During the Past Month.

BY THE FOUNDER OF THE FORESTER.

Cuba is much larger than Americans ordinarily suppose. After steaming at a fairly rapid rate for forty-eight hours along its southern shore and riding in the cars for ten hours from Cienfuegos to Havana one begins to appreciate its size and diversity, deprecate the fact that idleness has been forced upon its fertile soil, and wonder at its possibilities, which are indeed limitless.

Now that the health and peace of the island are assured, it is the proper time to consider its possibilities from an agricultural and forest standpoint. I have been especially interested in its forest conditions in crossing the island from Cienfuegos, in coasting along the south shore of the island and in short excursions from this city and from Santiago. I have been surprised to find so much of this island bare. Even in the mountainous districts the forest appeared to me sparse and thin. Immense areas have been cleared in times past for cane and tobacco plantations, and almost everywhere on uncultivated land fires have been set to improve the pasturage. Cuba has always been a great cattle country and this no doubt, at least in part, accounts for the lack of luxuriant forests in comparison with Jamaica and other tropical districts.

Owing to the lack of proper means of communication there is a lack of wood in in certain districts, especially the central portion. Wood and charcoal are in great demand for fuel; fence material is scarce; and even small poles, which are extensively used in drying tobacco in the field, are expensive.

The planting of forests in Cuba would pay as well, I believe, as elsewhere on the Western Continent. Communication from one part of the island to another is so bad, however, that the forest resources of large districts are at present unavailable and will be for some time to come. One often hears the statement, in a half-joking way, that in going from Santiago to Havana it is about as easy to go via New York as it is via Cienfuegos.

In coasting along the island one sees many fires, usually set to improve the pasturage. In other cases there are charcoal fires, and again burning canefields. I was told by a sugar planter here that canefields ingnite spontaneously when very dry and dense from the friction of their leaves in the hot tropical sun.

Charcoal is the fuel par excellence for tropical peoples. It emits no disagreeable smoke or gases and little heat, and can be used in braziers or small pots. The use of charcoal does not necessitate the purchase of a stove or the construction of a chimney. The establishment of plantations of some quick-growing species of tree for the production of charcoal would doubtless pay. For this purpose the Eucalyptus would be excellent. It is quite

A TYPICAL FOREST SCENE IN WESTERN CUBA.

likely that the exportation of charcoal to Cuba from our Gulf coast would be profitable, the main hindrance being its bulkiness and the difficulty in transporting it.

Chestnut and Locust, in my opinion, would grow well in Cuba. It is peculiar that northern plants, such as Irish potatoes and other vegetables, grow well here by the side of bananas, pineapples and other tropical plants. What is needed is good fence material, which can be sold in small sizes to good advantage. There will probably be an increasing demand for fence material, especially posts. The fences as they exist to-day consist almost wholly of barbed wire, propped up with all kinds of sticks and patched up with hedges of many kinds.

Logwood (*Hæmatoxylon campechianum*) forms a strong and durable fence, but must be kept well pruned. The heartwood and roots of this tree are shipped in immense quantities to the United States from Central America and Mexico. It yields a dye which is used for many purposes.

Considerable Cedar, Mahogany and Lignum Vitæ has been shipped from Cuba. The trees are usually far apart and are naturally becoming scarcer every year and the time is not far distant when their exportation will cease. The true West Indian Cedar is not a Cedar as we know it. The word "Cedar" is an indefinite term applied almost to any tree which produces an aromatic wood—in fact we have no true Cedar in the eastern United States. The true Cedar, in the strictest sense of the term is the Cedar of Lebanon and its near relatives, the Deodar and Atlas Cedar. Both the West Indian Cedar and the true Mahogany belong to the order Meliaceæ, which is a group of broad-leaved trees. Trees of this order grow very rapidly and produce a quality of wood which has no equal. I hope for the time when these woods may be systematically planted in Cuba. The scientific name of the West Indian Cedar is *Cedrela odorata*, and of the Mahogany, *Swientenia mahogoni*. In Jamaica the West Indian Cedar is dotted over pastures and along water courses. It grows to a large size and produces a handsome durable wood which has been extensively used for furniture, shingles, cigar boxes and ornamental work. It resembles Mahogany, but is of course inferior and much lighter. It is claimed that cigars packed in boxes of this wood retain their good flavor or are actually improved by imbibing the aroma of the wood. If this is so, however, it seems strange that they should line the box with paper.

True Mahogany was once no doubt abundant in Cuba, judging from the large number of structures which contain wood of this kind.

Lignum Vitæ (*Guaiacum officinale*) is still quite abundant in the mountainous districts of Cuba, judging from the dark green foliage which, in the distance, appeared to me to be this tree. It is exported in considerable quantities, and is extensively used in the manufacture of pulleys, blocks, mallets, balls, etc.

The frontispiece of this issue of THE FORESTER shows the nature of the forest of western Cuba. The most interesting feature of this picture is the Pine. This is *Pinus heterophylla*, or the Cuban Pine, which extends southward from our Gulf Coast into Cuba and Central America. From this tree the Isle of Pines derives its name. I have been told the same is true of Pinar del Rio. I have heard that the Pines on the Isle of Pines are small in diameter and of little use for timber, although on the mainland and in Central America fine specimens of this species may be seen. This Pine is scattered throughout the Bahamas, and was formerly there known as *Pinus bahamensis*.

Since writing the article for THE FORESTER on the planting of the Eucalyptus in our tropical possessions for the purpose of preventing malaria, I am now more than ever convinced that in many districts it would do an immense amount of good, not only to improve the health conditions and beauty of the island but to supply in a very short time a much-needed material for fuel, fences, etc.

In the Tropics nurse trees are necessary for the production of certain crops. Chocolate, for instance, demands protection and shade. Grass grows well in the shade

of trees, in fact, even on plantations not concerned in the production of wood, trees are invaluable in tempering the fierceness of the tropical sun. In fact there are many tropical products which can be grown only in the shade. It seems to me, therefore, that the vast pasture lands of Cuba might be profitably planted in Eucalyptus trees with benefit to the grass and the cattle. The Eucalyptus throws very little shade anyway, owing to the fact that its leaves hang edge to the sun. I have noticed three young Eucalyptus trees in yards in the suburbs of this city.

The glory of Cuba is the Royal Palm. The accompanying picture shows a group of these palms with a group of Cuban women in the foreground. It is everywhere abundant—scattered in fields, along water courses, fringing plantations or forming majestic avenues. The bullet holes in the trunks of these palms are evidence enough of the struggles which have occurred in this unfortunate island. Here and there may be seen long beautiful avenues of this tree which seem to have led at one time to the doorway of some plantation house which now no longer exists. The houses of the natives are usually constructed of the leaves of this tree. Without the Royal Palm the natives would be in dire straits for building material. It forms a cool house which although not beautiful in appearance is suited to the peculiar existing conditions. The nuts of this tree, which form in large bunches just below the crown, are said to be excellent for feeding swine. Nothing is more characteristic of Cuba than this palm, the representation of which may be seen on the Cuban two-centavos stamp.

A very common and beautiful tree in the Tropics is the Mango. Of all fruits none is relished more by the natives. It is at the same time a magnificent shade tree.

The most common shade trees in the streets of Cuban cities are the Spanish Laurel, Beefwood, *Ficus indica*, West Indian Almond and the Sand-box tree. Beefwood, which resembles a conifer in the distance, is *Casuarina equisetifolia*. It is a native of Australia and the East Indies. Its wood is hard and heavy. It is sometimes called the Toa-tree. *Ficus indica* is the sacred Bo-tree of India. Although not as tall and straight, it reminds one of a Poplar. It has a leaf similar to the Cottonwood. The West Indian Almond is not an Almond at all. It is *Terminalia catappa*. The Sand-box tree is *Hura crepitans*. It is called the Sand-box tree because the vessel which contains its seeds was used in early times to hold sand for blotting purposes. It is also called the "Monkey's-dinner-bell" because the fruit explodes with a loud report scattering the seeds and thereby attracting the monkeys of the forest.

A GROUP OF ROYAL PALMS.

Dotted everywhere over the island are magnificent Ceiba, or Silk Cotton trees. This tree grows to immense size and is supported by large, twisted, far-reaching buttresses. Its wood is soft and almost useless and the tree is usually festooned with masses of epiphytic plants which cling to its soft bark. It was under a giant Ceiba-

tree, now known as the "Surrender-tree," not far from San Juan Hill, that the Spanish general surrendered his sword. Its buttresses have been mutilated by souvenir hunters, but it is now protected by a barbed-wire fence.

Cuba has an excellent climate and a fertile soil. Her northern shore is the coolest and most delightful part of the island. Within sixty or seventy hours of New York it should be and no doubt will be, in time, the Riviera of America. The island has been in an unsanitary condition, but the climate is one in which the white race can live at least the major part of the year in perfect health. The statement which one often hears that the white race cannot thrive for any length of time in the Tropics is in my opinion, after three years of life in the Tropics, a great mistake. The best workmen to-day in the Tropics are Spanish and Portuguese emigrants. The opinion of the white men who have lived for some time in the West Indies and know how to care for themselves, is that the climate is healthful. The American soldiers with whom I talked were unanimous in pronouncing it a healthful climate. Were any of our northern cities in such condition of filth as existed in Cuba during Spanish rule epidemics of disease would have been constant.

The soil of Cuba is of such a nature that everything can be raised easily and in abundance. Its beauty and quaintness is equal to that of southern Spain and Morocco. There is room for millions of people. It is in need of energetic gardeners and fruit-growers. It needs orchards and forests. I have no doubts but that olives, grapes, English walnuts, oranges, prunes, chocolate and hundreds of other fruits may be easily grown there. What is needed in Cuba is an experimental station and a botanic garden—such as exist in Jamaica, where plants of all kinds from everywhere may be tested—because in this line Cuba is capable of almost limitless possibilites. It would be an excellent place for Northern students to go for study just as Europeans go to Buitenzorg in Java. In fact the Tropics are biological headquarters, where everything is intense, where plant physiology, the basis of forestry, agriculture and horticulture, may be studied to the best advantage.

JOHN GIFFORD,
Havana, April, 1900.

Forest Protection and Restoration.

A Paper Read Before the University Farmers' Club Convention at Pasadena, Cal.

(AS REPORTED FOR THE "RURAL CALIFORNIAN," LOS ANGELES.)

Farming, which includes fruit growing, is the chief corner-stone of prosperity in southern California, and any action leading to the perpetuation and increase of the water supply for irrigation in the summer months, must necessarily interest the farmer, as well as it should all industries dependent upon the successfully grown crops, which, all will concede now, cannot be accomplished without plenty of water. The past two dry years have been invaluable to our people, inasmuch as we have studied and practiced the most economic use of water. Also the question how to hold in reserve the usually bountiful supply of winter rains. The rain that falls upon the field and orchard, however copious, is but one-third of the amount necessary to produce good crops. If southern California is to be developed in the fullest, no water must be permitted to run to the sea. Foreseeing this our federal government

has wisely withdrawn from the market all the unsold brush and timber land which is largely mountainous.

When we consider the fact that the annual rainfall on the mountains is several times greater than in the valleys, and that the mountain area is many times greater than the arable area, the importance of impounding this water is obvious to all. The most practical and natural plan is to keep our mountains well clothed with verdure, not only to retain the water by percolation to be given up to us in the summer, but to prevent destruction by floods.

You have demonstrated in many localities the past summer that there is a vast supply of water in the gravel beds beneath the surface, and many orchards have been saved by its use, but it must be remembered that nearly all of this water fell upon the mountains, and every stream that flows or is pumped from this subterranean supply is as a hole in the bottom of a pail, which will necessarily be soon exhausted unless the supply is replenished. This work is being taken up and prosecuted vigorously by the agricultural department of our government.

In the past, incalculable loss has been sustained by the herding of sheep and by fires. The first great menace has been disposed of by excluding this hoofed locust from our reservations. The past year has shown great progress in the prevention of fires by a system of patrol, which is to be doubled the coming year. All parts of the mountains are being made accessible and where fires naturally run, spaces are being cleared to make it possible to check the flames. Stricter laws are being formed and penalties are to be inflicted upon the persons who violate these laws.

The reforesting of the denuded portions of the mountains is of the greatest importance. More than 90 per cent. of the area burned off in southern California has been brush. The tree-covered sections are much less liable to be destroyed. All of the old forests in the San Bernardino reserve show evidence of fires in the past—the partly burned trees are still existing. Brush land, however, is swept clean. The roots are not often killed, and in the course of 25 years will recover the ground, more sparsely and with less vigor each time. It is important to plant the seeds of Pine trees on the burned areas as soon as possible that the trees may keep above the brush, and if planted thickly the brush will die in a few years for want of light. There will be no necessity of experimenting to ascertain what trees to plant. Nature has done all that. Growing at different altitudes and under different conditions, we find the Pines, Cedars, Spruces and Firs. Each has its zone, and to take them from their home—that is, to greatly different conditions—they will not flourish. The Tuberculata Pine will thrive on the hot, dry, steep slopes of our mountains from the foothills to 4500 feet altitude. They will grow without the least protection from the sun, and in ten years would cover the entire surface, excluding the wind and sun. Moreover, where they are found growing in solid masses, with no underbrush, they resist fire remarkably. The higher elevations can be successfully planted to the other Pines and Firs and Sequoias. With our mountains once covered uniformly with evergreens, they would be beautiful to look upon, and all anxiety as to the future supply of water would be at an end.

The expense will not be great. Twenty dollars per acre will cover cost of seed and all labor. There do not appear to be available funds with the department at Washington to prosecute this work at present, but they heartily approve the proposition as practicable and desirable. The Forest and Water Association of Los Angeles County has taken up the question and will begin work this month. It is hoped all farmers in this county will become members of the Forest and Water Association, and that in each county in southern California there will be organized an association to help on the good work. When this is done and a system of storage reservoirs is built, as contemplated, there will be no need of dreading future dry years.

T. P. LUKENS,
Pasadena, Cal.

The Forests of Cochin China.

BY M. BONDE, CHIEF OF THE FOREST DEPARTMENT IN THAT COUNTRY.

The forests of Cochin China occupy about one-sixth of the whole area of the country, or about two and one-half million acres, not including the islands of the gulf of Siam, which have another 250,000 acres. There are over 3,000,000 acres comprised in the "Sea of Bamboos" and ancient clearings, but no account is taken of these as they contain no tree vegetation. Generally speaking, the forests are found in the east and northeast. In the west, with the exception of the island of Chaudoe or "Seven Mountains," there are only forests of *tram*, Melaleuca cajeputi, "*palétuviers*" (translation unknown) and inferior species. Where the forests are found the soil is undulating or hilly. The Sea of Bamboos is in the south, and the real forest lies between this and the independent tribes of Moïs to the north, and Cambogia. The soil is mostly alluvial.

Lower Cochin China is cut up by numerous canals and tributaries of the Mekong and Donai which are used for transporting the timber. Since the conquest of the country all the banks of these rivers have been cleared, and the agent of the Messageries Maritimes has already drawn attention to the coming time when large steamers will no longer be able to reach Saigon.

The forests contain many fine species, but utilizable individuals are scarce, for even at the time of the conquest the forests were exhausted. Since then they have been still more persecuted, so that certain species, instead of being found a few miles from the main roads, no longer exist within fifty miles of them. Only junglewoods are left, which look nice enough, but are not saleable. The species are very numerous and of the total some fifty are worthy of special attention and preservation. It has been proposed to reduce this number to half a dozen or so, but even in France such a change would require a century, and in Cochin the forests, if their present mismanagement by the civil authorities continues, will have disappeared long first. The deciduous species are found more especially in the plains; the hilly parts contain a mixture of both deciduous and evergreen trees.

Clearings became so numerous after the Conquest that there was urgent need for a forest regulation law. The decree of Sept. 14, 1875, was promulgated, but failed of success, so far as disforestment was concerned, through the establishment of a *permis de coupe*.

The commission of enquiry which preceded the decree had intended to create a class of responsible dealers, and sought this end among other things by exacting a payment of 140 francs, but it also created a profitable monopoly for the fortunate individuals who might be able to get a hold on all the timber to the detrement even of the administration itself. It also unwittingly lent itself to a system by which Chinese or Annamite concessionaires, holding permits, but not dealing in timber, were able to sublet their contracts to men over whom there was no adequate control.

The decree of 1875 had the one great advantage from the revenue officers' point of view of ensuring a considerable revenue but it took no heed of silvicultural requirements. It said nothing about the mode of exploitation, which could only be properly controlled by the trained forest service. Consequently the sub-contractors go where they like, cut what they like.

The forests are watched by French guards who were till lately purely fiscal officers, but a decree of July 31, 1896, reorganized the Department to some extent, though its functions are still not properly defined. As a natural consequence the forest service and the Revenue Department are more or less at loggerheads and the former finds all its efforts crippled by the inertia or opposition of the latter.—*Indian Forester*, translated from the *Revue des Eaux et Forêts*.

Some Observations of Ohio Woodlands.

The land now occupied by the Commonwealth of Ohio was at one time a mighty expanse of timbered country, within whose majestic solitudes the savage roamed and the stately animals of the forest lived and thrived. Could we have seen that mighty woodland in its grandeur we could well have understood why the original inhabitants had called the great river and its surroundings "Beautiful," or, in the language of the Red Man, Ohio.

We are told that the pioneers who first took their way westward from the frontier of Pennsylvania, plunged into a mighty expanse of forest.

With the possible exception of a comparatively small tract in the Northwestern corner, this was true. These pioneers, hardy men and women that they were, must needs have land to put to cultivation that they might earn a livelihood. They could not raise crops in the forest, and thus the woods had to be cleared away. To this immense task they at once set themselves, and with such aggressiveness did they apply the axe that by the year 1853 a little more than fifty-five per cent. of the land was all that remained wooded.

It is easy to understand how these hardy people should come to hold a hatred for timber land. The men who worked to fell the trees, clear the land, burn the brush and logs, prepare the land for crops, and harvest the crops from among the stumps, certainly found what hardship meant. Their sons who helped them, who from the time that they might be of any use in the woods had toiled from morning till night to clear land for agricultural purposes, also conceived a natural enmity for trees and woods, and considered them a nuisance.

This same spirit still exists in a greater or less degree, and it is especially evident when the action of the people is necessary to push any legislative action regarding forestry. "Get rid of the timber," is the sentiment of too large a proportion of the people of the state, and to change this opinion can well be made the object of our scientific bodies, colleges, and the press. The idea still prevails that all lands left to timber are just so much extra burden to the owner, and that if this is true, the sooner they are cleared the better.

Now, how is this? Let us see in a brief way whether the plan of having timber upon the farm ready to be drawn upon for the needs of the farmer is not a wise saving of time and money. There are a thousand ways in which timber is needed upon the farm, and one of which is likely to make itself known at any time. If a trip must be made to the lumber yard it means an expenditure of time and money, while if the timber is on hand, ready to be used, this extra time and trouble will be saved. In buildings, frames, fences, rolling stock repair, etc., especially cut timber of various kinds is often needed. If it must be especially cut and prepared by the dealer the expense becomes great, while if it can be cut and prepared by the farmer himself and upon his own farm, he is independent and will save trouble and expense.

Aside from the direct financial side of the question there are other reasons why each farm should have a woodlot of some size. In the first place the timber is a protection for property and live stock. Every one admits the value of standing timber as a protection from strong winds, and while it is not a good plan to use the woodlot for a pasture field, still the protection afforded by the trees extends far enough to be useful for some distance into a field adjoining. Then the presence of woodland is always conducive to rural beauty, which item, even in a strictly commercial agricultural community is not to be ignored.

We find in some authoritaties upon forestry statements that the proper ratio of land to hold in forests is from fifteen to twenty-five per cent. This percentage must no doubt be governed by the character of the country, the hilly lands demanding more of a forest cover than the level lands. Taking the minimum amount, 15 per cent.,

however, let us see how well our state has her forests distributed.

By referring to the statistical chart we notice that in 1896 the percentage of woodlands for the state was about 17.8 per cent. (a little more than our minimum, but which has probably been lowered since that time), but that in some of the counties the amount fell far short of this. At the time just mentioned thirteen counties had over twenty per cent. in woodland, while seven counties had less than ten per cent. It is also interesting to note that not more than three of the counties possessing over twenty per cent. of woodland could be classed as "watershed" counties, for the three rivers flowing southward through the state. It is in these rivers that the heavy floods of the past few years have been occurring.

Now, while we admit that much of the increase of floods is due to the clearing away of the forests, at the same time we must allow that it is not all due to that one cause. The increase of agriculture, the improvement in drainage—tile drainage, township ditches, etc.—are all helps in getting the water out of, and off of, the land more quickly, thus swelling the rivers.

Referring again to the chart, we will notice that during the period from 1853 to 1870 just about 17 per cent. of the woodlands of the state was cleared. From 1870 to 1886, 16 per cent. was cleared. From 1886 to 1896, 4 per cent. was cleared, making a total of 37.6 per cent. of the woodland of the state of Ohio that has been cleared since 1853, and leaving in 1896, 17.4 per cent. of the lands of the state in timber.

It will be seen by referring to the color chart of the State of Ohio, that far too many of the counties of the State are short in the amount of timber-land, taking 15 per cent. as a standard. The counties below the standard number forty-three, within one of being one-half the number of counties of the State.

In the States where the greatest activity in forestry exists, there are large tracts of land that cannot well be devoted to any other purpose than raising trees. In Ohio no such areas exist. New York has a forest preserve in the Adirondacks of some 1100 square miles. In the report of the Commissioner of Forestry of Pennsylvania for 1896, the engineer member of the forest commission mentions six tracts that are recommended to be used as forest reserves, and containing from 200 to 2,000 square miles each.

While Ohio may have some rough land that is unfit for agriculture there are no such tracts as this that have been surveyed with the intention of making forests. Even the lands that we have that would come in this class are not located so as to be of any value as river controllers. In the State of Ohio the stipulation that "to have a good forest you must have a large continuous area" could not well be heeded. Ohio is an agricultural State, and where once stood the continuous forest primeval are now the happy homes of prosperous farmers. The ancient forest has been broken up and where of old the wind swept through the majestic arms of Oak, now the breezes wave the growing grain, and fan the herds of the modern dairymen.

The advance that has been made in agriculture precludes all possibility of having State forests of any great size, or in locations that will be of any other benefit than a place to grow timber. The land is divided into small farms and the cultivation has become so intense that even a few trees here and there are not allowed to remain standing. What, then, are we to do? Let us make a suggestion.

We have said before that the percentage of woodland should not fall below 15 per cent. Now, how better can this forest be proportioned than to have reserved upon every one hundred acres of farm land 15 acres of land for timber. To induce proprietors to put this plan into operation, let the land thus occupied be relieved from taxes. This may sound like a flight of imagination, but something of the kind must be done for the welfare of the residents of the towns and cities of the State as well as for the rural districts; and if for no other reason than regulating our water supply, in the name of the people let some action be taken.

JOHN E. CUNNINGHAM,
Columbus, Ohio.

The Study of Forestry at Yale.

Announcement of the Curriculum of the New Department of the University at New Haven.

In accordance with the announcement made in the April issue, THE FORESTER is enabled to detail herewith the courses arranged for the Yale Forest School to be opened, in the autumn, at New Haven, Conn.

The list of instructors has been completed, with the exception of the assistant professor of forestry and the assistant in civil engineering, by the choice of Addison E. Verrill, M.A., Professor of Zoölogy; Samuel L. Penfield, M.A., Professor of Mineralogy; Louis V. Pirsson, Ph.B., Professor of Physical Geology; Alexander W. Evans, M.D., Ph.D., Instructor in Botany; Hon. Edwin B. Gager, B.A., Instructor in Law.

The regular course is designed to cover a period of two years. The subjects have been so arranged that nearly all the preliminary work is completed in the first year. Enough technical forestry is taught, however, during the first year, to enable the students to make silvicultural studies, to investigate the growth and production of trees and forests, to establish forest plantations, and to make thinnings and other classes of cuttings. The second year is devoted to advanced technical work in the class-room and in the field.

The courses of instruction for the first year studies have been arranged as follows:

FIRST TERM:—*Outlines of Forestry*—Lectures, 3 hours. *Silviculture*—Lectures, 3 hours. Field work. *Forest Measurements*—Lectures and recitations, 2 hours. Field work. *General Morphology of Plants*—Laboratory work and informal lectures, 4 hours (to count as 2 hours). *Forest Botany*—Lectures and laboratory work, 2 to 4 hours (to count as 2 hours). Excursions. *Mineralogy*—Laboratory work, 4 hours (to count as 2 hours). *Zoology*—Lectures, 2 hours.

FIRST HALF SECOND TERM:—*Silviculture*—Lectures, 3 hours. *Forest Measurements*—Lectures and recitations, 2 hours. Field work. *General Morphology of Plants*—Laboratory work and informal lectures, 4 hours, (to count as 2 hours). *Forest Botany*—Lectures and laboratory work, 2 to 4 hours (to count as 2 hours). *Elementary Petrology*—Lectures, 1 hour. *Zoology*—Lectures 4 hours. *Forest Physiography and Meteorology*—Lectures, 4 hours. *State and National Forestry*—4 to 6 special lectures.

SECOND HALF SECOND TERM:—*Silviculture*—Lectures, 3 hours. Field work. *General Morphology of Plants*—Laboratory work and informal lectures, 4 hours (to count as 2 hours). *Forest Botany*—Lectures and laboratory work, 4 hours (to count 2 hours). *Origin and Nature of Soils*—Lectures, 1 hour. *Zoology*—Lectures, 1 hour. *Surveying and Field Engineering*—Field and class room work, 4 to 8 hours (to count as 4 hours). *Forest Hydrography*—4 to 6 special lectures.

In the second year the courses to be given will be:

FIRST TERM:—*Forest Management*—Lectures, 4 hours. Field work. *Forest Technology*—Lectures and laboratory work, 2 to 4 hours (to count 2 hours). *Lumbering*—Lectures, 2 hours. *Forest Protection*—Lectures, 2 hours. *Forest History*—Lectures, 1 hour. *Jurisprudence and Law*—Lectures, 2 hours. *Diseases of Trees*—Lectures, 2 hours.

FIRST HALF SECOND TERM:—*Forest Management*—Lectures, 4 hours. Field work. *Forest Technology*—Lectures and laboratory work, 2 to 4 hours (to count as 2 hours). *Lumbering*—Lectures, 2 hours. *Forest Protection*—Lectures, 2 hours. *Forest History*—Lectures, 1 hour. *Forest Administration*—Lectures, 1 hour. *Forest Law*—Lectures, 1 hour. *Forest Roads and Trails*—Lectures 1 hour.

SECOND HALF SECOND TERM:—Field

work in Pennsylvania and in the Adirondacks.

As the Forest School begins its first year in the Fall, the courses of the second year will not be offered during the college year 1900–1901; but are printed as planned, in order to show the curriculum in full.

The courses on Technical Forestry will be particularly under the direction of Henry S. Graves, Professor of Forestry, the head of the new school. Professor Graves will give the courses on Silviculture and Forest Measurements during the first year, and those on Forest Management and Forest History in the second year.

The first of these courses will treat of the characteristics of forests, the forests of the world, forest regions of the United States, trees important in forestry, methods of conducting silvicultural studies, methods of reproducing forests and the treatment of forests. Forest planting will be taught in the spring term by the Assistant Professor of Forestry. Attention will also be given to the planting and care of trees in streets and parks for ornament and shade, with notes as to the relative suitability of different trees to these uses.

In Forest Measurements Professor Graves will teach the methods of determining the contents of felled and standing trees and of whole stands; methods of estimating timber; use of American log scales; determination of diameter, height, and volume increment.

In the second year the course on Forest Management will include forest measurements applied to the preparation of working plans, forest valuation, forest finance and the underlying principles and methods of preparing and carrying out forest working plans. The course on Forest History will consider the rise of Forestry abroad and in the United States, and the present practice of Forestry in different countries.

Mr. Gifford Pinchot's lectures on State and National Forestry will review the interest of the States and the United States in forestry; province of State and Federal action in forest matters; forest reserves; State forest officers and organizations; Federal forest officers and organizations; government forestry abroad.

The other courses in Technical Forestry will comprehend the following, no assignment of instructors having yet been announced:

Outlines of Forestry:—Designed to give a comprehensive view of Forestry with special reference to its economic aspects. It considers the purpose and scope of Forestry, its importance in national economy, the indirect influence of forests, the relation of the State to forests and Forestry, the need for Forestry and its practice in the United States.

Forest Technology:—Study of commercial woods in relation to their uses and important characteristics.

Lumbering:—Methods of lumbering; transportation of logs and lumber; milling; preparation of wood for market. Secondary forest products.

Forest Protection:—A consideration of trespass, fire, grazing, insects, wind, torrents, drifting sand, etc., and of practical measures to protect forests against injury from them. This course will include the study of insects affecting forest trees so far as that subject is not treated in the course in Zoölogy.

Forest Administration: — Principles underlying the establishment of a forest service; present laws relating to the administration of forests in the United States; rules and regulations relating to the public lands, Forest Reserves and National Parks.

Some general comment upon the other courses will also be of interest to many readers of THE FORESTER. In Botany, beginning with the simplest forms, the various groups of plants will be taken up in suitable types, and their structure, development, and mode of life, studied and compared. Attention will be given to the identification of trees and shrubs, their distribution, habit, and uses. Herbaceous and cryptogamic plants will be considered so far as a knowledge of them may prove useful to the forester.

The instruction in Mineralogy will be carried on by means of practical work in the laboratory, and is intended to familiarize the student with the common minerals, attention being devoted especially to those which are of economic, geological, or sci-

entific importance. To understand better the chemistry of the subject, the student first will be made familiar with the simple chemical and blowpipe reactions useful in testing minerals, applying this knowledge later to the determination of unknown species. Students will have access to a labeled collection, where they can study the properties of the minerals and make comparisons, and also to extensive unlabeled collections, arranged especially to give them practice and facility in the correct identification of minerals. This is one of the regular courses of the Sheffeld Scientific School of the University.

There will also be given a series of lectures of an elementary nature, and without the use of the microscope, on the history, origin, and classification of rocks with special reference to their geologic relations and economic properties; and the origin and nature of soils with special reference to forests—the latter course being designed to supplement the previous course and to complete the students' necessary knowledge of rocks and soils.

Especial interest attaches to the course on Forest Physiography and Meteorology to be given by Professor Brewer, whose position in the faculty of Yale University has been a prominent one for many years. Under his instruction students will investigate the general conditions necessary to forests; elementary meteorology; forests as related to temperature and its range; to rainfall and its range; to excesses of weather and climate; to the mechanical and chemical nature of soil and groundwater; to the geological character of the surface; to the relief-forms of the land; to other geographical features; the geographical distribution of forests; the aspects of forests as related to climate and topography; and the geological history of forests.

Another very interesting course will be that on Forest Hydrography, to be given in a series of lectures by Mr. F. H. Newell, of the United States Geological Survey, Washington, D. C. This course will include the flow of streams; diurnal and seasonal variations; non-periodic fluctuations; regimen of various rivers; effects of forests and cultural conditions on available flow, and underground water.

In Surveying and Field Engineering a special course will be given, occupying two afternoons in the week, which will give the student the training in surveying and field engineering necessary to the forester.

The course on Forest Roads and Trails will cover the principles of road construction so far as such knowledge is necessary to a forester.

Of the Law courses, that on Jurisprudence will consist of an historical and philosophical view of the law in its great outlines, as common to all nations, and particularly as developed in the Anglo-Saxon race. The course is designed to point out also the principal rights acquired, the duties owed, and the liabilities incurred in the every-day conduct of affairs.

In the course on Forest Law there wil be a special consideration of the laws and decisions in the various States with reference to trespass, river driving, breach of contract, and damages resulting from forest fires.

International Congress of Silviculture

Secretary James Wilson, of the Department of Agriculture, having been invited to participate in the International Congress of Silviculture at the Paris Exposition, has sent the following letter to M. Daubree, Conseiller d'Etat, etc., Ministre de l'Agriculture, Paris, France:

"Sir: I have the honor to acknowledge the receipt of your communication of March 10, 1900, inviting me, as President of the American Forestry Association, to attend the International Congress of Silviculture, to be held in Paris from the 4th to the 7th of June.

"I beg to assure you of my high appreciation of this invitation, and to state that it would give me great pleasure to accept it, were it possible to do so. I regret, however, that official duties will prevent me from leaving the country at that time, and it is therefore incumbent upon me to decline, with great regret, your courteous invitation."

The Development of Forestry.

It is one of the encouraging indications of the future that lumbermen and timber owners are beginning to take a concrete interest in the possibility of timber reproduction. There is noted not alone a wider discussion of the subject, but a more practical consideration of it, which latter holds out a substantial promise of valuable results. There was a time when a lumberman looked upon anything and everything which bore the forestry label as a product of a mild sort of insanity, that could not in any way be of value to him, and that it would be a waste of time for him to talk or even think about. Happily this idea is passing away as forest science takes a more practical turn, and as the condition of the remaining timber supply forces upon lumbermen the fact that it cannot endure forever. A forest expert could hardly have secured an audience of lumbermen twenty or even ten years ago, and even if obtained he would have had great difficulty in interesting them.

The change, however, is not entirely in the attitude of the lumbermen. The men who are talking forestry now are different in style, and the forestry they are advocating is altogether different in character, from that which was talked about a few years back. Then forestry, as generally understood in this country, was almost wholly conservative, and had for its immediate object the preservation of existing trees for the protection of the country and for the benefit of the future generations; the forestry of the present day, and the sort that interests practical lumbermen, has for its chief end the utilization of the matured trees in a way to obtain their maximum value, and the maintenance of forests, solely as investments of income-earning capacity. These are purposes that appeal to a business man, and he naturally is interested in the methods by which such results are to be secured.

It would be premature to say that the problem of making forests pay in this country has been solved, by means of a few lectures and talks from forest experts, even though of the most practical character. Unfortunately the task is not one to be so easily disposed of. The theory of forest management is comparatively simple, and a good many interested in timber and forest lands are getting to have fairly correct ideas about it; but there is room for a very large development yet in the application of these ideas in practice. It will take a deal of careful study, and probably much experimental work, of which a good deal may be expected to be unsuccessful, before we shall have any considerable forest area under such management as the present theory contemplates. To reduce this theory, admittedly good and necessary, to practice is a work that will require time and patience. The convert to the forestry faith who fancies he can buy a few thousand acres of trees, and without much trouble introduce the methods prescribed for their profitable handling, with the result that he will speedily be able to count upon a steady income upon the capital invested, doubtless will find that there are some practical and perhaps expensive lessons to be learned. Our conditions and requirements are so different that old world methods will not answer, and so we are forced to create methods of our own.

So long as forestry was regarded merely as a scientific question, and one in which the present generation was not particularly interested, but little progress could be looked for, but as its character changes, and it becomes more and more a matter of business, the prospect of doing something with it brightens rapidly. There is abundant capacity available for dealing with any problem, the solution of which means the assurance of so many per cent. income upon large investments, and as the forestry question begins to assume this aspect we find the interest in it increasing among business men. The fact is evidence that the development of forestry ideas is in the right direction, and that it is progressing at a rate that is highly gratifying.—St. Louis *Lumberman*.

The Minnesota Park.

1. A Statement from the Official Head of the State Forest Work.—2. A Review of Some Desirable Features of the Proposed Park.

(See also page 118.)

For the information of the general public and in order to refute the many exaggerated statements regarding the cost of the proposed National Park in Minnesota, General C. C. Andrews, chief forest warden of that State, has made the following statement:

The proposed park comprises 218,470 acres of water surface and 611,692 acres of land. Of the latter 121,802 acres, in scattered localities, have been allotted to Indians, leaving 489,790 acres to be paid for. Of this latter 100,000 acres in round numbers, and no more, may be regarded as merchantable "Pine lands." By "Pine lands" is meant, according to the Interior Department's construction of Indian treaties and public land laws, lands that are valuable for the merchantable standing Pine thereon; all other lands, whether bearing Jack or Scrub Pine or other sorts of timber or no timber, are considered, under the existing treaty with the Indians, as "agricultural lands," and when proclaimed as open to settlement may be taken in 160-acre tracts at $1.25 per acre by actual settlers under homestead law conditions as to residence and cultivation.

Although the greater part of these lands technically designated "agricultural lands" are not desirable for farming and would not be taken up for cultivation for many years, if ever, yet in any new negotiations with the Chippewa Indians to obtain the land in bulk the government naturally would have to pay for it at the rate of $1.25 an acre, which would amount to $487,237. It will be conceded that this is a large price when one remembers that there are millions of acres of land in northern Minnesota which have been open to homestead settlers for thirty years and that are still vacant; and that a railroad company sold similar land to the State for a part of Itasca Park at 50 cents an acre.

The estimates of the "Pine lands" in the proposed park have not been published, but the statistics of quantities and values of "Pine lands" on the Red Lake reservation, where the Pine was as good if not better than in the proposed park, will enable one to arrive at a reasonably safe conclusion as to their value. The annual report of the Commissioner of the General Land Office shows that 291,348 acres of Chippewa Pine lands have been estimated and that the value of the same was found to be $1,774,728 at $3 per thousand feet. This is at the rate of $6 (actually $6.09) per acre. Since then the average price of standing Pine in Minnesota has risen to $4 per thousand feet (board measure), which would make the Pine lands worth $8 an acre. Accordingly, a fair valuation of the 100,000 acres of Pine lands in the proposed park would be $800,000, to which add the value of the so-called agricultural lands, $487,000, gives $1,287,000 as a fair valuation of the park. To make it surely ample, let us say in round numbers $1,500,000, which should be paid to the Indians as the price for the park.

The important fact about this is that this principal sum would not have to be appropriated. In its dealings with the Indians the government does not pay them the purchase money in cash, but stipulates to pay it in fifty years—it credits them with the amount and pays them interest thereon at 5 per cent. per annum. If a Commission appointed by the President (and if our delegation in Congress were to insist upon it they could have such a Commision appointed) should negotiate with the Indians for the purchase of this park, all that Congress would have to do would be to appropriate $75,000 each year for interest. All the stories that have been circulated as to the need of appropriating millions of dollars for the pur-

chase of the park may be regarded as bugbears.

One further word. If the park be obtained, the Pine will be treated on forestry principles. The ripe Pine, except that off the shores of lakes, will be cut, the younger Pine be allowed to mature and the forest perpetuated. The influence of the park will be to give farmers cheaper lumber.

C. C. ANDREWS.

The Minnesota Park: Its Purpose.

What are the Minnesota National Park people trying to do?

They are trying to influence Congress to retain for the nation at large a pleasure ground covered with stately Pines and many Oaks, Maples and Cedars, in which are three great lakes—Cass, Leech and Winnebigoshish—seventy smaller lakes and numberless small streams, feeders to the Mississippi River, which latter meanders through the tract. The waters of this region have abounded in fish for thousands of years and do abound to-day. These woods harbor deer and moose by the thousand, and will do so for all time if preserved.

The Government owns this land, subject to certain Indian rights. The lumbermen of Minnesota, through the efforts of certain State representatives in Washington, are trying to force through a measure known as the Nelson bill, which practically will rob the Indian of the timber and then drive him off the reservation.

The park proposition involves the taking over of the timber and land, at proper valuation, by the Government and the payment quarterly of the interest on such valuation to the Indians; the leaving of the Indians unmolested on the reservation with land allotted to them upon which to live. The Government, it is proposed, shall step in and go to the necessary expense in building roads and making other necessary improvement. Yearly the Government, under well-known forestry rules, shall cut the mature timber only. This would mean a perpetual cutting of the timber and a perpetual replenishment. The natural attractions of the park, the primitive life of the Indian resident tribes and the magnificent fishing, all will tend to make this a resort second not even to the Adirondacks or Maine woods and lakes.

In preserving these woods the Government would be protecting the very source of the Mississippi River—the reservoir, in fact—that runs through a valley to which it is estimated 31,000,000 inhabitants to-day are contiguous.—*Forest and Stream.*

Forests of Indiana, Reliance of her Manufacturers.

An Address Before the Indiana State Board of Commerce at its Annual Meeting in Indianapolis.

BY THE SECRETARY OF THE INDIANA FORESTRY ASSOCIATION.

The Nineteenth Century will almost measure the termination of Indiana's forest wealth. Twenty-eight thousand square miles, covered with Oak, Walnut, Hickory, Ash, Maple, Poplar and other valuable woods was our inheritance. Nowhere upon the American continent did there exist a body of timber superior to that nurtured by the soils of Indiana, and covering four-fifths of her area. Only thirty years have passed since it was asserted that the supply of hardwood lumber in Indiana could never be exhausted, Indianapolis being at that time the center of this trade for the entire United States, supplying Boston, New York and other cities. But a continuous drain upon nature's resources, lavish though she be with her benefactions, must sooner or later exhaust the supply, unless some provision is made for its renewal.

The result of a century's clearing is ap-

parent, almost the entire body of this vast forest has disappeared, and 82 per cent. of the lumber now used in our manufactories is brought from other states. The alluvial plains of Arkansas and Mississippi, with a limited mountain region in Kentucky, Tennessee and North Carolina, supply most of our hardwoods. The Gulf States yet contribute Yellow Pine, which is also being exported to Europe and Africa, as well as supplying America; while the White Pine region of our northern borders has gradually receded, as year by year the axeman penetrates deeper into the forest to supply the enormous demand for building material.

The Cape to Cairo Railway has contracted for its vast supply of ties to be obtained from our southern woodlands. A former Secretary of Agriculture, Mr. Morton, said in a report : "The United States consumes every day 25,000 acres of timber. Each night we retire with 25,000 acres less of forests than the sun gilded with its morning's gold."

The largest wood pulp mill in the world is at Sault Ste Marie. Twenty-two acres of the best Spruce land is cleared and converted by this mill into 250 tons of pulp in a single day. This is consumed by a great newspaper in two days. But the rapid cutting of the forests in the Upper Lake regions has stopped their supply of wood and a serious famine threatens this industry. Canada demands an export duty on wood of $1.90 per cord, in order to protect its forests from annihilation. The flower of the forest, the young, thrifty trees are taken for pulp, entirely preventing the maturing of any trees for future lumber.

The great manufactories of Indiana are dependent upon wood, for no substitute has yet been found which possesses the peculiar qualifications of Hickory for carriage wheels, axles and shafts; of Ash for buggy bows, handles of tools and agricultural implements; of Cottonwood for bodies; of Oak for wagon work, and when quartered, for furniture, as well as many other woods in all manufactures.

The printing-press distributes the world's daily news on sheets of wood, so that the timber supply becomes an important factor in journalism.

Fifty thousand citizens of Indiana are employed in wood industries and each year receive $15,000,000 in wages, while a quarter of a million women and children are dependent upon these employes for their support. The finished product of this labor brings annually $50,000,000 to Indiana manufacturers.

Indiana's railway commerce is borne upon 30,000,000 wooden cross-ties which must be renewed at the rate of four and one-half million ties annually, the cost of which is 15 per cent. of the entire operating expenses of the railways.

Several million acres of land within our borders are practically valueless for agriculture. These consist of knobs, bluffs, steep hillsides and undrained swamps, which it were better should be growing in timber, and would thus in time produce a revenue for the State. Besides, this would preserve the climatic conditions so essential to successful agriculture and for the maintenance of the water supply, all of which are in great danger from the destruction of forests.

"Every forest is in its depth of leaf mould a store of springs, a laboratory whence clouds are exhaled and showers sent up to be redistributed on the earth. Every forest holds back in its leaf mould the torrents which otherwise pour in destructive floods across treeless places into swelling streams which carry desolation and death along their valleys." (History of Forestry.)

In 1898 six and one half million acres of land in Indiana were unaccounted for among productive lands of all kinds. If this vast area could be afforested, it would add to the State's material wealth, $500,000,000, doubling the value of our land assessment, whereas, if allowed to remain as at present, no income can be hoped for by the State, unless some hidden mineral should be discovered, since it possesses no value to its owners. The average valuation throughout the State is nearly twenty dollars per acre, ranging from $46.00 in Marion county, to $7.34 in Harrison

county, where much is broken and less suited to agriculture.

If the various manufactures are to be continued, no time should be lost in securing some kind of forest growth upon this less productive area. Not only are forest productions becoming scarcer each year, but transportation charges increase greatly with the greater distance from which lumber must be brought, and the tendency will be to remove factories to points nearer the source of supply, and we may thus lose the great manufactories unless we produce at home the wood necessary for their maintence.

The greatest consumers of wood give least thought to the continuance of its provision. Railways use by far the greater quantities of timber, yet the managers and officials, aware that several years must elapse ere a benefit can be derived from trees now planted, and fearing lest they be not retained in their positions for so long a period, are unwilling to perform a duty which will benefit their successors in office. They refuse to consider the future needs of their corporations, or the permanent interests of their stockholders, and reject propositions leading to an increase of the forest area.

If our manufacturers, who know that their very existence as business firms depends upon their ability to secure the raw product, wood, are unwilling to consider means for providing this material, and aid in creating a greater interest in forestry, who then can be expected to perform this task?

From the fact that we cannot see the daily growth of a tree, an erroneous impression prevails that forests cannot become profitable within the lifetime of a man and landowners are careless of their young growths and hesitate to plant.

In examining a deed an Oak tree 5 inches in diameter was found recorded as the corner in 1881. This tree now measures 62¾ inches girth, a gain of 15 inches diameter in 18 years. If the farm was covered with such trees, it would sell for $250 per acre instead of $10. The Walnut will grow in twenty-five years to a size suitable for lumber, becoming then worth $500 per acre or more, and after removal, leaves the land so enriched as to be productive for many years. Red Cedar is adapted to rough locations. Telegraph poles have been cut in Crawford county where forty years ago the land was in cultivation. A square mile of land in Kansas planted with Catalpa trees twenty years ago, is now supplying cross-ties and telegraph poles.

Since it is so important a supply of timber be maintained, the greatest encouragement should be afforded landowners in planting and caring for woodlands. Information must be given farmers that they may have a knowledge of the subject. To this end the Indiana Forestry Association was organized, and it should have the support and coöperation of manufacturers. During the first six months of its existence, the Association, although its means were quite limited, secured the planting of 500,000 trees, while one railway company has been induced to plant 50,000 Catalpa trees for cross-ties.

General William Henry Harrison planted Catalpa trees, used Catalpa fence posts and advocated the planting of these trees. Posts set by the General in 1808 are still in use. Stockade timbers at Vincennes attracted attention almost a century after. While seven years is the durability of Oak ties, the Catalpa remains sound after five successive renewals of Oak. The wood is as easily wrought as Pine, and much resembles White Walnut. The trees grow readily from seed, are transplanted without difficulty, and are hardy throughout Indiana. Young trees for forest planting are obtainable at from $3 to $5 per 1000. Several nurseries are engaged in growing forest seedlings. Furniture equaling Walnut has been made from Catalpa trees ten years from seed. White Oak, Pine and a majority of trees require from forty to one hundred years for maturity, Catalpa becomes valuable in from twenty to twenty-five years.

The Indiana Forestry Law looks to the establishment of as many small forest reservations as there are farms, and distributed with regularity throughout the State, rather than an aggregation of trees in any one locality. A specific assessment

of one dollar per acre is provided for these reservations. I think, however, there should be some provision by which certain lands of low value should receive the benefit of this provision without restriction as to area. The benefits to be derived by the State by judicious planting of forests will justify such act.

JOHN P. BROWN,
Connersville, Ind.

Forest Influence on Water-Flow.

Report of an Investigation of the Mill Creek Watershed in Pennsylvania.

The Mill Creek Watershed, near Johnstown, Pa., the scene of the disastrous flood of several years ago, has lately been examined by Mr. Henry S. Graves, Superintendent of Working Plans of the Division of Forestry, and Mr. J. W. Toumey, Superintendent of Tree-Planting, in compliance with the request of the owners, as noted in the March FORESTER. The results of this trip have been embodied in a preliminary report of the present conditions existing, with recommendations for the future management of the watershed, which comprises a total area of from four to five thousand acres of mountain land, from which the water supply of the City of Johnstown is derived.

Two reservoirs have been constructed upon Mill Creek, the larger one having a capacity of ninety-three million gallons, but, owing to the rapidity of the run-off, the present supply of water is barely sufficient for city uses. The question of how to conserve the available supply, and therefore, prevent alternate floods and droughts was investigated.

As a result of the examination of the tract, the forest experts find that two important objects can be attained by applying improved forest methods to the management of this watershed:

1. A more uniform flow of water will result from such management, and the supply will not be affected, as it is at present, by the washing and erosion from denuded areas, which at times badly discolor the present supply.

2. By the proper management of this forest it can eventually be made a source of considerable income, without lessening its value as a cover.

The report says further: "There is reason to believe that the income from the mature timber will ultimately pay all expenses incurred in making working and planting plans and in following them in the future management of the watershed. The prospective value of the second growth of timber now covering a large part of this watershed is considerable, and sufficient to warrant protecting it from fire and handling it according to practical methods of forestry, aside from the necessity of doing this in order to obtain the best and most constant water supply.

"The entire watershed was originally covered with Hemlock and mixed hardwoods, although at present no considerable area of virgin forest remains. About four-fifths of the entire tract has grown up with a second growth, mostly of hardwoods from thirty to fifty years old, which provide an excellent cover from the standpoint of run-off, although not so desirable as an evergreen cover.

"About one-fifth of the total area is now, or has been recently, under cultivation. Although the greater portion of the land is stony and ill-suited for agricultural purposes, it is well adapted to the growth of trees. About 500 acres of the cleared land is now owned by the Johnstown Water Company. As the intention of the Company is to withdraw this from cultivation, it is highly desirable that it be reforested as early as possible, as it will not only improve the watershed from the standpoint of run-off, but will ultimately be a source of income from timber increment."

The report states that planting cannot be judiciously attempted in a single year, but should extend over several, and the

nursery stock be grown there. The species recommended for the major part of the planting is the White Pine, which is indigenous to this region. This tree makes a rapid growth, provides an excellent cover, and is of great commercial value. In general, the plan of planting for the entire tract is described as follows, the details of the plan to be worked out at the time of making working and planting plans if the Company decides to attempt the work:

"1. The major portions of the large open areas to be planted to White Pine, alternating with fields seeded to Black Locust in which acorns and chestnuts should be planted later.

"2. The smaller areas, which are already beginning to grow up to Black Locust, Cherry, and occasional other hardwoods, to be filled in with one- to three-year-old seedling Pines and hardwoods from the adjacent woodlands, supplemented by the planting of acorns and chestnuts.

"At present the land at the headwaters of Mill Creek is covered with an excellent forest cover. There are patches where fire has done considerable damage, but a comparatively dense growth of brush and young trees has sprung up immediately after the fire, so that the run-off of the streams has probably not been affected. Practically the entire tract has been lumbered over, and the present timber is second growth, with the exception of small patches of Hemlock and Oak which were for some reason overlooked by the lumbermen.

"There is very little Pine on the entire area. Where the valleys are narrow, patches of Hemlock occur, but upon the moderate slopes at the headwaters of the streams the forest is composed of hardwoods. The predominating tree is Chestnut, mixed with White, Rock, Black, Scarlet and Red Oak, with occasional Maple, Cherry, Ash, Basswood, Poplar, Birch and Gum. The general condition of the second growth is very good. The trees have an apparent age of about 30 to 50 years, but in certain localities older trees may be found.

"Most of the timber is not large enough for anything but mine props and cordwood, but there is an occasional Oak and Hemlock large enough for logs, and a considerable number of Chestnut and Oak suitable for ties. These latter are, however, for the most part scattered, or in small groups. The forest is in many cases in need of thinning, and it is probable that enough material could be obtained in the thinning to make a fair profit. Fortunately, there are throughout the tract numbers of lumber roads, so that the question of transportation would not be difficult.

"The main value of the forest is prospective, but within ten to twenty years many trees will come to a marketable size. Many Chestnuts are already large enough for poles and ties, and within a decade or more very large numbers can be cut for this purpose.

"The reproduction of the trees is admirable. Most of the Chestnut and a considerable number of the hardwood are sprouts which have come up since the cuttings and after the fires, but there are also a large number which have come up from the seed.

"The whole forest shows marks of fire, but only on a comparatively small area has much damage been done. On top of some of the ridges and on several south slopes the timber has been almost entirely killed and the succeeding growth consists of Sassafras, Locust, Bear Oak, and occasional specimens of other trees and shrubs. Enough injury has, however, been done to the standing timber to show the necessity of an effective system of fire protection."

The plan of constructing fire lines is not deemed advisable at present, but three measures are suggested as necessary to secure adequate protection against fire: (1) A fire patrol; (2) A system of trails to enable the rangers to reach every part of the tract readily; (3) Posting notices against starting fires. The moral effect of the last suggestion is held to be a considerable protection. Under a competent forester and assistants, the report concludes, the results would more than compensate for the expense incurred in the scientific management of the watershed.

Public Interest In Forestry.

Forestry in Canada.

The Canadian Forestry Association, lately organized, as mentioned in the April FORESTER, bids fair to accomplish much for the good of the Dominion by a campaign to advance the following objects of the Association:

"To advocate and encourage judicious methods in dealing with our forests and woodlands.

"To awaken public interest to the results attending the wholesale destruction of forests, as shown by the experience of older countries in the deterioration of the climate, diminution of fertility, destruction of rivers and streams.

"To consider and recommend the exploration as far as practicable of our public domain, and its division into agricultural, timber and mineral lands, with a view of directing immigration and the pursuits of our pioneers into channels best suited to advance their interests and the public welfare. With this accomplished a portion of its unappropriated lands would be permanently reserved for the growth of timber.

"To encourage afforestation wherever possible.

"To promote forest tree planting, especially in the treeless areas of our northwestern prairies, upon farm lands where the proportion of wood is too low, upon highways and along streets, and in the parks of our villages, towns and cities.

"To collect and disseminate, for the benefit of the public, reports and information bearing upon the forestry problem in general, and especially with respect both to the wooded and prairie districts of Canada.

"To educate the youth in matters pertaining to forestry.

Colorado Reforestation.

A committee of the Colorado Forestry Association consisting of President W. N. Byers, Lute Wilcox and Secretary D. W. Working, has sent to Colonel W. T. S. May, United States forest superintendent, a communication compiled from responses sent in by members of the association regarding the effect of forest fires, trees suitable for reforestation, etc. The letter asserts that more injury is done to forests by fires than by the ax of the chopper, and Colonel May is asked to prevent the spread of fire if possible, and to secure the punishment of the lawless.

The native species of trees, such as Yellow Pine, Red Fir, White Fir, and Engelman Spruce are decided to be the best adapted to the varying localities, the last named for moist situations over 8000 feet. Native shrubs appear to be the best suited for denuded hillsides where the retarding of excessive water flow is desired. A rapid growing deciduous tree is recommended for the reforestation of burned areas.

The strip method of thinning, with modifications to suit the ever-varying conditions, is recommended wherever thinning is necessary. The width of strips will depend on the height of the natural growth. The young growth needs protection, but must not be "protected" to death.

Pennsylvania Arbor Day.

The first of the two Arbor Days appointed by Governor Stone, of Pennsylvania, was celebrated April 7th, in Philadelphia by a large meeting at the New Century Club, under the auspices of the Forestry Committees of that club and of the Civic Club, and the Pennsylvania Forestry Association. Letters were read from Governor Stone, Mayor Ashbridge, and Provost Harrison, of the University of Pennsylvania, endorsing the efforts of the three organizations. Addresses were delivered by two members of the American Forestry Association, Dr. Joseph T. Rothrock, State Commissioner of Forestry, and Miss Mira Lloyd Dock, of Harrisburg—and by Dr. Emily Gibbons Hunt. Many trees were planted, but the main outdoor work was done on the second Arbor Day, April 20th.

Studying American Forests.

The Grazing Investigation.

Mr. Gifford Pinchot, Forester of the Department of Agriculture, and Mr. F. V. Coville, Botanist of the same Department, will leave Washington for the West about May 15th, to make a personal investigation of the problem of grazing in the forest reserves. The restriction of sheep-grazing in these areas has raised a storm of protest from wool-growers, and public feeling in the West has become divided and intense.

The tour of these officials will be the first actual work in the field in carrying out the plan fully described in the April FORESTER. They will be met at Holbrook, Arizona, by a committee consisting of A. E. Potter, of Holbrook, Secretary of the Arizona Wool-Growers' Association, and J. E. Bark, of Phœnix, who represents the cattle and irrigation interests. They will spend three weeks in the Black Mesa Reserve and then visit others in Arizona. Later in the summer the examination will be extended to other western reserves.

An American Town Forest.

Superintendent of Tree-Planting J. W. Toumey, has returned from a short trip during which he examined three tracts in different states. The first was a tract of 800 acres of woodland deeded a century ago to the town of Brunswick, Me. It is proposed to improve the tract and make it a town forest, such as in Europe is often found to furnish a large part of the municipal revenue.

The land was originally in White Pine and Pitch Pine, but the growth has been so severely burned and so closely cut over, that its present timber is scattered and mostly of a poor quality.

At a recent meeting of the Town Council, one hundred dollars was appropriated to improve the land by planting it to White Pine. After an investigation, however, Professor Toumey finds that two things are necessary, in proposing a plan for its future management, before planting: (1) Protection of present growth from forest fires; (2) Prevention of the cutting of immature timber.

If the tract is given adequate protection against fire and the vacant places are planted to White Pine, it will ultimately become a valuable forest. The planting will be under the direct supervision of a well-known forester, Mr. Austin Cary, of Brunswick, but the Division of Forestry will assist in organizing and carrying out the work.

For Water Conservation and Timber.

Spring Valley, N. Y., was the next place visited by Professor Toumey. As the result of his investigation the Division of Forestry is making a planting plan for putting into timber twenty-five acres of land adjacent to a reservoir from which is secured the water-power to operate a large cutlery works.

The third locality visited was Sandy Run, in the anthracite coal region of the Lehigh Valley, in Pennsylvania. This tract consists of 1600 acres of mountain land, for which planting plans are desired. On examination it was ascertained that practically the entire area has been repeatedly and severely injured by forest fires, and that much of the young timber, including young Oaks and Chestnuts from four to six inches in diameter, was being repeatedly cut for "lagging,"—the overhead timbers used in the mines. Professor Toumey determined not to recommend planting as an economic proposition for any portion of the tract, as the entire area will of itself come into valuable timber, such as Oak and Chestnut, if protected from fire and injudicious cutting.

Forest Reserve Working Plans.

The Lewis and Clark Forest Reserve, in Montana, has been selected as the second to be examined by the Division of

Forestry with the view of preparing forest working-plans. Mr. O. W. Price, an official of the division, will organize the work about June 1st and will be joined later by a number of assistants. The stand and rate of growth of the timber will be determined, and a system of lumbering will be devised which will meet the demand for lumber without impairing the value of the forest.

This reserve contains 2,926,000 acres. It is chiefly in a broken and little-known region, but has valuable forests, and the timber is locally in demand. Lodgepole Pine, Larch, Red Fir, and White Pine are the principal trees. Much damage is done by fires, and their prevention will form an important part of the system to be applied.

Similar work is now in progress under Field Assistant E. M. Griffith in the Black Hills Reserve, in South Dakota. About July 1st the work will be extended to other reserves.

A Forest Income.

The University of the South, at Sewanee, Tennessee, has placed its 8000-acre tract of hardwood timber near that town under the management of the Division of Forestry. An official of the Division will mark all trees to be cut and will draw up the logging contracts to provide for the preservation of young growth. It is intended to make the forest yield a permanent annual revenue to go toward the support of the college.

Another interesting tract to come under Government supervision is one of about 47,000 acres, owned by the Adirondack League Club. It is in the Adirondack Mountains of New York, near Lower Saranac, and is kept primarily as a game preserve. The working plan will provide for the removal of all timber which can be spared without injuring the forest.

Tree Planting and Evaporation.

Tree planting for an unusual purpose has been recommended to residents of the western irrigation districts by W. L. Hall, Assistant Superintendent of Tree Planting of the Division of Forestry, who has recently been in New Mexico on an investigation. Agriculture in, that region depends largely on irrigation, and the streams and reservoirs are much depleted by evaporation due to the heat and dry winds. Mr. Hall recommended that belts of trees be planted along every ditch and reservoir, not only to shade them, but to shelter them from wind. The problem of preventing evaporation is very important, not only on account of the loss of water, but because the percentage of alkali in the quantity remaining becomes excessive.

Diminution of Stream Flow.

The watershed of Rock River, in northern Illinois, will soon be the subject of an investigation by the Division of Forestry in order to determine the cause of the diminution of the stream. This is supposed to be due to the denudation of the forests along its headwaters and to excessive artificial drainage for commercial and agricultural purposes. The decrease in volume of water has become alarming, and, in response to the agitation of citizens in that locality, their Representative in Congress, Hon. R. R. Hitt, has applied to the Secretary of Agriculture for an investigation. G. Fred. Schwarz, Field Assistant in the Division, will proceed to Rock River in a short time to study the conditions and report what action he finds advisable.

American Foresters Abroad.

A party of American foresters, consisting of J. V. Doniphan, Jr., F. W. Reed, N. M. Ross, Percy Brown and A. H. Wert, students of the Biltmore School of Forestry, Biltmore, N. C., sailed on the steamer Phœnicia on April 7th for Hamburg, Germany. They will spend several months in the forests of Germany studying under the direction of Dr. C. A. Schenck, Forester of the Biltmore estate. Later Sir Dietrich Brandis, for some time Forester for the English government in India, will join the party and act as their guide through the Black Forest.

Recent Legislation.

National.

The United States Senate Committee on Appropriations practically doubled the amount named by the House Committee for the Division of Forestry. The House bill carried $48,520, and the Senate bill $88,520. The conference committee, it is believed, will agree to the Senate bill allowing the increase.

Minnesota Park Commission.

The House of Representatives Committee on Indian Affairs on April 26th directed a favorable report on the bill creating a commission to consider the establishment of a national reserve or park of the Leech Lake, Winnebagoshish, and Cass Lake Indian reservations in Minnesota, comprising about 830,000 acres. The commission was fixed at three members from each branch of Congress, and an appropriation of $5000 was allowed.

New York.

The new appointees of Governor Roosevelt on the New York Forest, Fish and Game Commission took the oath of office at Albany on April 25th. They are: W. Austin Wadsworth, of Geneseo, president; Percy Lansdowne, of Buffalo; Frank Woods, of Jamaica; Dewitt C. Middleton, of Watertown, and Delos H. Mackey, of Delaware County.

On the day previous to the induction into office of the new commissioners, Governor Roosevelt invited to meet them the following gentlemen prominent in forest matters: F. H. Newell, Gifford Pinchot, Treadwell Cleveland, Jr., George Bird Grinnell, Caspar Whitney, C. Grant La Farge and James MacNaughton. The personnel of the new commission has inspired the greatest confidence that the forest possessions of the Empire State will be most jealously conserved, and guarded by wise legislation against injudicious treatment.

Mr. Wadsworth has been appointed also a member of the State Forest Preserve Board, to succeed former Commissioner Charles H. Babcock, whose term has expired. On April 20th this Board voted to purchase over 30,000 acres of land in the Adirondacks. The tracts to be taken for the State are well located, are surrounded by other portions of the State forest preserve, and were obtained at a very low figure. Seventeen thousand acres of lumber land in Hamilton county was bought at $1.50 per acre, and a tract of 13,000 acres in township 35 was secured at $2 an acre. The latter purchase contains a portion of Forked Lake and also all of the Sargent ponds, three of the most beautiful lakes in the wilderness. With this the State acquired also the right of way for the public from William C. Whitney, through the Racquette river and Forked Lake on township 35. Other smaller parcels of land aggregating about 2000 acres were also purchased, part lying in Hamilton and part in Franklin counties, with a tract of 500 acres at Big Moose station, in Herkimer county.

In the New York State Assembly the appropriation bill introduced and passed during the past month contains the following paragraph:

"For the superintendent of forests for the payment of the expenses of experts furnished by the United States Bureau of Forestry for estimating standing timber and other information regarding the lands and trees in the forest preserve, two thousand dollars, or so much thereof as may be necessary."

This provision will enable the Division of Forestry to prepare working plans for the New York State Preserve in addition to the work conducted under its appropriation from the National government.

Another paragraph of the bill provides for "the payment of a salary of the chief fire warden, his expenses and the payment of the compensation of three foresters authorized by the amendment to chapter twenty of the laws of nineteen hundred,

from the date of their appointment to October first, nineteen hundred and one, the sum of seven thousand five hundred dollars, or so much thereof as may be necessary." These officials serve under the State Forest, Fish and Game Commission.

Title to Land in the Forest Preserve.

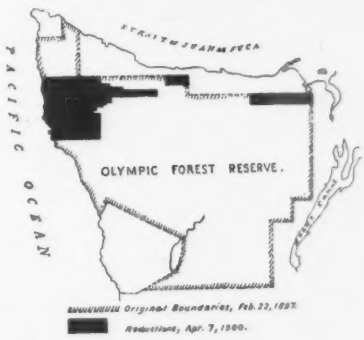
A case involving the title to a tract of 585 acres of wild land in Franklin county, N. Y., and now included in the Forest Preserve, shows a number of interesting features, as reviewed by the New York *Times*. The tract in question, owned by Ferris J. Meigs, was sold in 1881 for nonpayment of taxes, and in 1884, after the two years allowed for redemption, was conveyed to the State.

In an ejectment suit brought in the Supreme Court by Meigs, three years ago, against State Controller Roberts, the main defense aside from the tax title was that the action was not brought within the time prescribed by law, and was barred by the statute of limitations. On the trial, at the St. Lawrence special term, the plaintiff traced his title by a chain of conveyances from an original grant by the State in 1798. The trial court dismissed the complaint, on the ground that the premises were part of the Forest Preserve, and in the occupation of the State. The Appellate Division of the Third Department, by a divided court, directed a reversal, but the Court of Appeals recently reversed the Appellate Division and affirmed the decision of the trial court.

Judge Cullen, giving the opinion, holds that the law of 1885, re-enacted in part in 1891 and 1893, which makes the Controller's conveyance, executed upon a tax sale, conclusive evidence, after the lapse of two years from its record in the county in which the lands conveyed are located, of the regularity of the proceedings in which conveyance was made, although in some aspects a curative statute, is primarily and essentially a statute of limitations. After the Controller had, in 1894, published the statutory notice that the lands were thereby declared to be and thereafter should be deemed to be in his actual possession for the State, the previous owner, failing to prove any actual possession in himself or his grantors, could not, the Court held, in 1897 maintain this ejectment action, it being barred by the lapse of more than two years since the publication of the statutory notice, and by the statute the State acquired not only constructive but actual possession of the lands conveyed by the Controller's deed.

Changes in Olympic Forest Reserve.

By a presidential proclamation, dated April 7th, the areas defined in black on the accompanying map were withdrawn from



the Olympic Forest Reserve, on the Olympic peninsula in the State of Washington, and restored to the public domain. Some of the finest timber in the reserve is to be found in these areas. They contain in the neighborhood of 360 square miles, and are now open to settlement.

Of the lands thus withdrawn many parts were already in the hands of private owners. According to the regulation which provides that the owners of a claim in a Reserve may return it to the government, receiving in compensation the right to take up another claim, these lands might have been handed back to the Reserve once more. But instead of helping to complete forest reservations in the way desired this regulation resulted in encouraging the owners of holdings to cut and sell all merchantable timber immediately, and then demand the right to take up another claim. For this reason when a strong movement to throw open

large areas of the Olympic Reserve began, a movement which started with those who, for various reasons, desired to increase the population of the region, or who were interested in its lumbering possibilities—Mr. Henry Gannett, Geographer of the U. S. Geological Survey, recommended to the Department of the Interior that such districts as contained most of the private holdings be returned to the public domain. These districts with a few more are those defined in the President's proclamation of the 7th ult., and which may be seen on the map.

Forest Notes.

A Bachelor of Forestry.

Dr. B. E. Fernow, director of the New York State School of Forestry, has announced that the first student in that institution to receive the title of Bachelor in the Science of Forestry is R. C. Bryant, of Illinois; a son of the well-known forest tree grower, and grandson of the author of the little volume: "Forest Trees for Shelter, Ornament and Profit." (1871.)—Mr. Bryant is now in the Adirondacks to work up a thesis on the following work:

To produce the data for a working plan, and, with given conditions, formulate plans of operation: *a*, for a selected tract of 120 acres, *b*, for a fictitious tract of 24,000 acres, for which (*a*) furnishes the type areas. A part of the latter work will be to furnish a complete working-plan under the following supposed conditions:

a. That silvicultural considerations are uppermost and owner is indifferent to returns, using Heyer's formula for budget equalization.

b. That the highest annual net return on the investment be secured for the next twenty years, when a working fund of $24,000 is to run the business; keeping in mind proper silvicultural policy.

c. Financial statement of conditions twenty years hence.

Gift of Forest Lands.

The State of Pennsylvania has received, by donation from one of its citizens, a tract of 420 acres of mountain lands in Westfall township, Pike county, the only consideration being that the outstanding taxes for the last two years, amounting to $35.49 should be paid by the Commonwealth. These taxes having been paid, title has passed to the State. The tract adjoins other land recently purchased by the State Forestry Commission.

Under the recent forestry laws the State Commission has purchased and paid for over 100,000 acres of land and has in negotiation about sixty thousand acres more.

A Matter of History.

The Spessart forests in northern Bavaria may be cited as an interesting example of the value of forest conservation.

In 1570 the giant Oak trees of the Spessart (now worth $80 apiece) had no value whatever; the forests served as hunting grounds and were used for pasturage. In 1600, glass factories were established on the outskirts of the forests, penetrating gradually, in the course of fifty years, to the center of the forest, using Beech-charcoal for glass-manufacture. At the same time floating of Oak timber commenced to supply cooperage-works in the Main and Rhine valleys. In 1666, rules were enacted tending to protect the forest and to regulate its use. In 1765, the Government found it advisable to make a forest working-plan to prevent over-cutting. The plan was made—a plan which seems ridiculous now, because it was based on entire ignorance of the rate of tree growth. In 1790, the plan was revised, the Archduke of Mayence borrowing from the Duke of Baden, a then famous forester, a Baron v. Tettenborn. At that time trees had assumed value, and it had become remunerative to spend money for their conservation.

C. A. Schenck, Ph.D.,
Biltmore, N. C.

THE FORESTER.

A MONTHLY MAGAZINE

DEVOTED TO ARBORICULTURE AND FORESTRY, THE CARE AND USE OF FORESTS AND FOREST TREES, AND RELATED SUBJECTS.

THE OFFICIAL ORGAN OF

The American Forestry Association,

President, Hon. JAMES WILSON,

Secretary of Agriculture.

THE FORESTER assumes no responsibility for views expressed by contributors in signed communications.

JOHN KEIM STAUFFER, EDITOR.

The passing of April, the month of Arbor Day observances in all the more progressive States, has shown more clearly than at any other time during the past year the extent of public interest in tree-planting and forestry,—whether regarded for pleasure or profit. One man plants a tree that he may admire its beauty, another plants a hundred acres that he may reap a harvest of ties and fence poles. The student of forestry, once looked upon as an enthusiast whose pleasure in the subject was his chief incentive, is now regarded in a different light even by the lumberman, who has come to a realization of the financial results possible through the scientific use of forest lands.

When the home-building colonist first invaded the forest, the energy with which he exercised his destructive tendency was largely a measure of his usefulness to society. There was no need of forestry then. But to-day, judging by the same standard of the public good, there is a call for forestry, as is well understood by every one who has lately looked into the subject. There surely can be no doubt in the mind of any one who reads THE FORESTER, and notes the diversified forms n which forestry appeals to American citizens, that it is a subject of the highest economic importance. And whatever tends to a more general public appreciation of existing conditions, strengthens the sentiment that because of the destructive policy of the past there must now be a constructive policy to compensate.

The greatest necessity, therefore, seems to be the diffusion of information regarding forestry and what it seeks to accomplish. In this connection the importance of Arbor Day becomes manifest. If forests must be cut down to supply a nation's present wants, trees must be planted to insure the meeting of future demands upon the supply. No longer is the forest a mine to be worked and exhausted, but a crop to be gathered and replenished from year to year. The tree-planting idea, then, as taught by the celebration of Arbor Day, apart from its æsthetic side, is made the vehicle of thought by which the youthful mind may progress to a full comprehension of what forestry means, and how much it may accomplish for the good of the State.

Regarding the increase in the membership of the American Forestry Association, the editor of THE FORESTER, under whose direction this work had been placed, takes pleasure in announcing the election of three new life members during the month of April—making six since February, five of whom sent in their applications during the past month. These are, in addition to those announced in the April issue: Mrs. James W. Pinchot, of New York City, Frederic A. Delano, of Chicago, and Amos R. Eno, of New York. Among the many annual members elected during the part month are: President Seth Low, of Columbia University, New York; Hon. Charles W. Garfield, President of the Michigan Forestry Commission; Col. W. T. S. May, of Denver; U. S. Senator Thomas R. Bard and the widely-quoted forest authority, John Muir, of California.

The number of annual members elected during the past few months, in response to the invitations sent out, approximates two hundred and fifty, the increase now averaging more than one hundred each month. If the ratio of increase continues in proportion to the number of circulars sent out during the past week, an equal number of additional new members will be announced, as the result, in the June issue.

The editor of THE FORESTER makes this resumé as a valedictory, as he presents the issue in hand as his final work as editor. He also relinquishes the duties of business-manager of THE FORESTER and assistant secretary of The American Forestry Association, which have been under his care during the past year, and the work of assistant treasurer of the Association, which he has performed since the annual meeting. THE FORESTER office will be removed to the Department of Agriculture, where it will be possible to keep in closer touch with the Division of Forestry.

Mr. Stauffer desires to extend his thanks to the members of the Association who have aided him in improving THE FORESTER since he began his work with the May, 1899, issue, the file of the magazine giving ample proof of how well they co-operated with him. All letters from members of the Association addressed to Mr. Stauffer personally, at 107 Corcoran Building, as before, will be promptly forwarded to him.

CHIPS AND CLIPS.

Minneapolis will experiment this summer with wooden block paving on concrete base, such as has proved very successful in Paris and Australia.

Pine and Hemlock stumps and old logs that were supposed to have become worthless years ago, are being gathered in northern Michigan to be manufactured into lath.

The Ontario government has completed arrangements for the formation of a forest reserve of almost three thousand square miles in extent, embracing the district in which Lakes Tamagami and Lady Evelyn are situated. The bulk of the reserve is virgin forest, with the finest White Pine in Canada upon it.

The scarcity of Hemlock bark is reported to have caused the almost total extinction of the once prosperous tanning industry in Maine. Though there is a large growth of Hemlock in the State, it is so far from practicable tannery sites that the cost of hauling prohibits its use.

One of the important early contributions to the forest literature of this country was the report on the trees and shrubs of Massachusetts made fifty-three years ago by George B. Emerson, a school teacher of that State. The woodland of Massachusetts is now worth half a million dollars more than it was thirty years ago.

The revival of shipbuilding in Maine has brought a great deal of southern lumber into the State, many cargoes of hard Pine having already been received from Savannah, Brunswick and other south coast ports, and others of Oak from Virginia. A fleet is also on the way north with materials for vessels lately begun.

A complete series of woods of Manitoba, consisting of specimens of Pine, Elm, Oak, Ash, Spruce, pulpwood, railway ties, etc., is the latest acquisition to the Canadian forest exhibit for the Paris Exposition. This is the most complete exhibit yet furnished from any part of the Dominion, though British Columbia has furnished larger specimens.

It is estimated that about 52,000,000 feet of logs will be put in on the Indian reservation in the northern part of Wisconsin during the winter. A lumber company is putting in about 30,000,000 feet on the Bad River reservation. About 12,000,000 feet will be put in on the Flambeau reservation, and about 10,000,000 feet on the Red Cliff reservation.

Over seventeen hundred trees have been planted in New York City during the past year by the New York Tree-planting Association, of which former Mayor Wm. L. Strong, is president. Nearly all the planting was done along the river front and in residence streets, but it is now intended to extend the work to the tenement house district, both for sanitary and æsthetic reasons.

California will have two exhibits of forestry at the Paris Exposition, one by the State itself and the other collected and forwarded by the Southern Pacific Railroad. While the former will represent the State accurately enough, the latter is planned to emphasize particularly the lumber and timber possibilities of California. All these specimens will be of strictly commercial woods, of which each variety can be duplicated in carload or cargo lots.

A heavily timbered section of virgin forest in St. Lawrence county, New York, has lately been offered for sale by the Saxe estate, in whose possession it has been for more than 30 years. The tract consists of 4600 acres of Adirondack timber land containing two deer ponds, four miles of brook, a mile of the DeGrasse River, some windfall clearing, and a hunting lodge. The tract has an investment value in the timber for pulp and lumber and an additional value for a park preserve.

CURRENT COMMENT.

Longevity in Trees.

The Red Cedar of the Pacific coast is a wonder of longevity. John Muir, the famous scientist, says he believes that most of the large Cedars are 2000 or more years old. Not only that, but they grow in the most unpromising positions, on practically bare, glacier-polished rock and at elevations where most other trees will not grow. In such places the growth is slow and they may be small, but, as Professor Muir expresses it, "they stand out separately and independent in the wind, living mainly on snow and thin air and maintaining tough health on this diet for at least 2000 years, every feature and gesture suggesting steadfast and dogged endurance."—*American Lumberman.*

Forestry and Finance.

One of the happiest places in the world is said to be located at Orsa, in Sweden. The community has, in course of a generation, sold nearly $5,000,000 worth of trees, and by means of judicious replanting has provided for a similar income every thirty or forty years. In consequence of this commercial wealth there are no taxes. Railways, telephones, etc., are free and so are schoolhouses, teaching, and many other things.—*Amer. Cultivator.*

Forests and the Public Welfare.

In the preservation of our forest lands, eternal vigilance is the only price of safety. Where there is any prospect of personal emolument, solicitude for the interests of the community or the welfare of posterity cannot be relied upon; hence the covetous eye of capitalists is ever measuring the feet of timber in the forests and gauging the water power of the streams.

It is an edifying sight, this of men already rich unable to view the glories of nature from anything but a commercial standpoint. There is no aspect in which man appears so mean and despicable; but still viler is the venal legislator willing to sell for a bribe the interests he is paid to protect. He relies on the fact that measures calculated to lay waste the forests and divert the streams are not readily recognized by the public, and that the immense importance of the preservation of wild lands, aside from all recreative purposes, is not widely understood or fully realized.

The great majority do not connect results of gradual development with their original causes. They do not realize that the denudation of forest land begun five years before is the cause of floods and droughts of five years later.—Brooklyn (N. Y.) *Life.*

A California Exhibit at Paris.

A unique and interesting feature of the Southern Pacific Railway Company's forest exhibit, at Paris, will be that of a monster sugar pine plank, 3 x 12 feet by 30 feet in length. This huge plank will rest on two sections of the tree from which it was cut, twelve feet in diameter and four feet in height. The ends of the plank will be placed on the center of these sections with a stairway at each end and a platform extending along its sides. Its sides will bear panoramic views of characteristic California forest scenery and maps of the state and of the Southern Pacific Railway system. The falling of the tree was caught by an animatoscope apparatus and will be the first of a series of moving pictures to accompany the exhibit. This series will show all of the various stages of logging, sawing, etc., ending with a moving railroad train loaded with lumber.—*Amer. Lumberman.*

The Picturesque Rock Pine.

In THE FORESTER for April, John Gifford, of Ithaca, N. Y,, in the course of an intensely interesting article on "The Pine Forest of Ravenna," says that this forest, in the delta of the river Po, has been famous for fourteen centuries. It is a Pine chiefly known on the shores of the Mediterranean as the *Pinus pinea,* Pine of Pines or Rock

Pine. This tree is unsymmetrical, and umbrella-topped, a most picturesque object and freely used by landscape painters to break the severe lines of architecture. It must have been planted throughout Italy for that purpose, as it is found everywhere in gardens. It is the common tree in Italian art. And Mr. Gifford has performed a real service in telling lovers of art the name of this tree so frequently seen in art that it has become conventional. The photographs of the Ravenna forest, reproduced to illustrate Mr. Gifford's article, show that the devotion of artists to this tree is fully justified. Mr. Gifford says: "It is associated with porticoes, pillars, fragments of old temples and other historic objects of the Italian landscape."—*Rochester (N. Y.)' Chronicle Democrat.*

The Growth of Caution.

In short, we conceive it to be excellent commercial tactics to push for an enlarged market abroad for anything and everything that we can produce in unlimited quantities where the result is to be to enrich rather than impoverish the country. We do not lose sight of the fact that if our forests could be stripped and the product marketed within a single year the wealth of the nation would be, temporarily, increased; but all will agree that such a move would be impolitic and unwise. Where, then, is the dividing line beyond which our lumbermen should avoid going, if possible?—*Lumberman's Review.*

Philippine Saw-Mills.

Lumbermen of Washington State are preparing to visit the Philippines for the purpose of putting in modern saw-mills. It is said that vast capital is behind the enterprise, and that the high-grade woods of the islands will become of great commercial value shortly.

A Lumber Plague.

At a recent inspection of the Southern Punjab Railway, in India, by the government inspector, it was found that creosoted Pine ties in service on this road were in good condition, while untreated Deodar ties were being seriously attacked by white ants.—*Indian Engineering.*

The Experience of Other Countries.

Once Spain and Russia had immense areas of forest, and climatic conditions were so modified and regulated by the trees that agriculture in those countries was a regular and reliable occupation. The trees were removed, and to-day both those countries have vast areas of virtual desert where once were fine farms, waving woods, permanent streams and lakes.

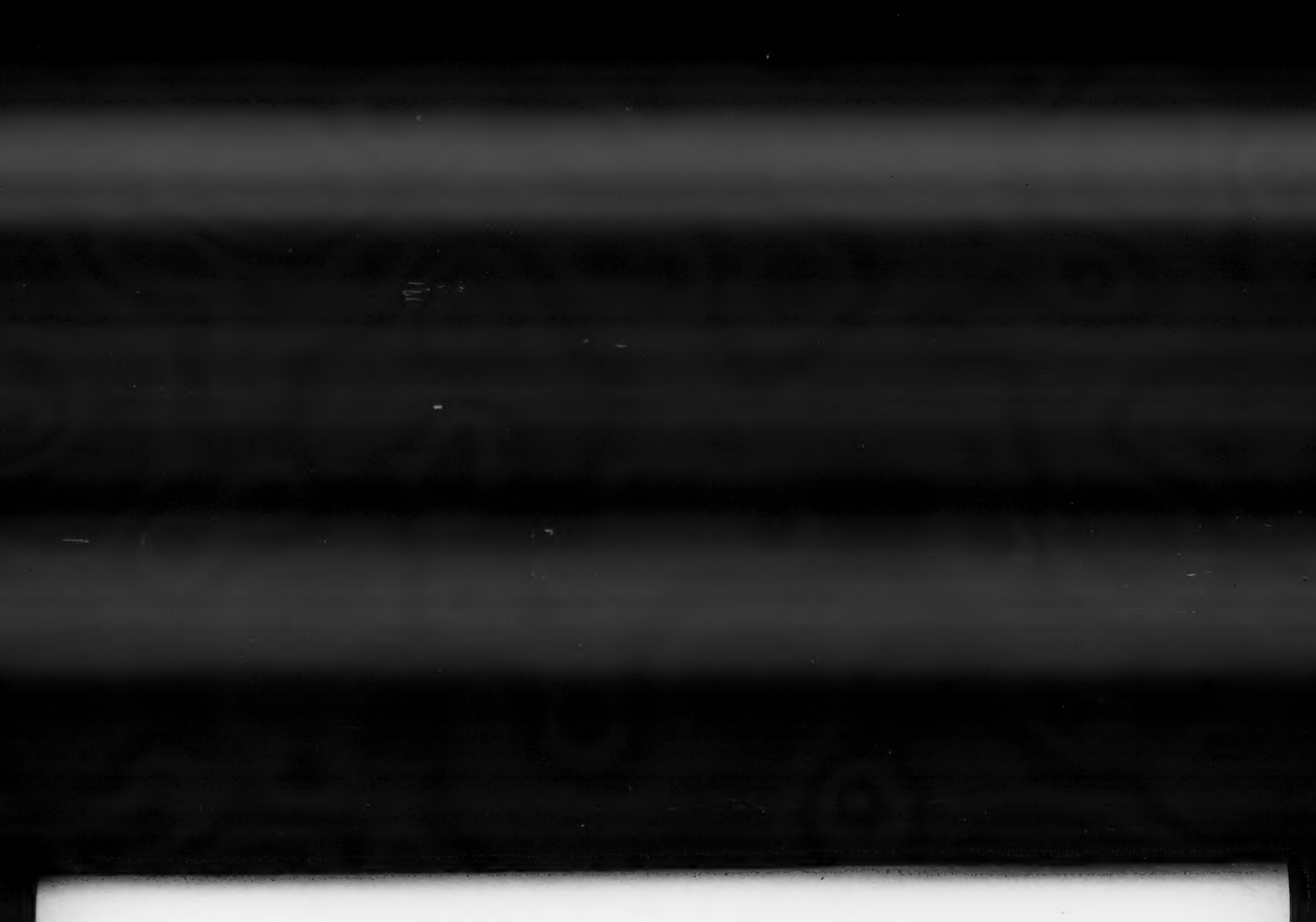
On the other hand, Germany, France and other countries, instead of destroying their forest resources, have utilized them and at the same time maintained them. In this way those countries have prevented disastrous climatic changes. The United States may well be warned by the results of deforestation in Spain, Russia and other countries to call a halt in the work of forest destruction.—Port Jervis (N. Y.) *Farmer.*

Forest Fires in Manitoba.

Press dispatches from Winnipeg, Manitoba, April 23d, gave startling accounts of loss of life and property through forest fires along the northeastern border. The fires began April 17th, but burned slowly for several days because of light winds. A dispatch says: "As the wind rose, the flames gained headway at an astounding rate. Before many hours the fire was sweeping a strip three miles wide and destroying everything before it. Some idea of the fierceness of the flames may be gathered from the fact that the water tank at Vassar siding was destroyed, though it was of metal and filled with water at the time.

A special train, entrapped in the burning woods, succeeded finally in reaching Winnipeg, after a thrilling experience in rescuing four men. The report brought by the trainmen was:

"Besides immense quantities of ties and wood, two large lumbering outfits, with over sixty wagons, are known to be burned. The drivers and bushmen have scattered in all directions, and out of 200 only about 30 are known to have escaped."



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